

Article

Enhancing Service Quality—A Customer Opinion Assessment in Water Laboratories through Artificial Neural Networks

Henrique Vicente ^{1,2} , Ana Fernandes ³, José Neves ^{2,4}  and Margarida Figueiredo ^{5,*}

¹ Departamento de Química e Bioquímica, Escola de Ciências e Tecnologia & REQUIMTE/LAQV, Universidade de Évora, Rua Romão Ramalho, 59, 7000-671 Évora, Portugal; hvicente@uevora.pt

² Centro Algoritmi/LASI, Universidade do Minho, Campus de Gualtar, Rua da Universidade, 4710-057 Braga, Portugal; jneves@di.uminho.pt

³ CBIOS, Escola de Ciências e Tecnologias da Saúde, Universidade Lusófona, Campo Grande 376, 1749-024 Lisboa, Portugal; teresa.vila.fernandes@ulusofona.pt

⁴ Instituto Universitário de Ciências da Saúde, CESPU, Rua José António Vidal, 81, 4760-409 Famalicão, Portugal

⁵ Departamento de Química e Bioquímica, Escola de Ciências e Tecnologia & CIEP, Universidade de Évora, Rua Romão Ramalho, 59, 7000-671 Évora, Portugal

* Correspondence: mtf@uevora.pt

Abstract: Existing literature presents multiple perspectives on quality within organizational contexts. Although these perspectives may differ, they universally emphasize the importance of meeting customer expectations regarding products/services. Consequently, organizations are dedicated to addressing customer requirements to foster elevated satisfaction levels. This study aims to assess customer satisfaction in water laboratories and develop a predictive model using artificial neural networks to improve service quality. A methodology was devised, integrating principles from thermodynamics with logic programming for knowledge representation and reasoning. Data were collected from 412 participants of both genders, aged 22 to 79 years old, using a questionnaire covering six specific areas, i.e., customer service, quality of service provided, support documentation, technical support, billing and payment, and online services and tools. While customer opinions were largely positive, the study identified areas for improvement, including clarity and effectiveness in responses to inquiries, reliability of results, clarity of analysis reports, usefulness of test interpretation guidelines, inclusion of legal information, billing options, and online services. Differences in satisfaction were noted based on socio-demographic factors such as age and academic qualifications. The findings offer a framework (an ANN-based model) for future evaluations and improvements in services, highlighting the importance of addressing specific customer needs to enhance satisfaction.

Keywords: customer satisfaction; water laboratories; quality management; entropy; the laws of thermodynamics; artificial neural networks



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